Data Storage

Data Compression Techniques

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Data Compression Techniques

Generic Techniques

- ✓ Lossless (no loss of data)
- ✓ Lossy (may loss data)

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Data Compression Techniques

Lossless Techniques

- ✓ Original data can be reconstructed from compressed data.
- ✓ Examples:
    - ✓ ZIP file format
    - ✓ Source Code
    - ✓ Text documents
    - ✓ Executable programs

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Lossy Techniques

- ✓ Original data cannot be reconstructed from compressed data, only approximation is possible,
- ✓ Examples:
    - ✓ Multimedia data (audio, video, images)
    - ✓ Streaming media

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Run Length Encoding

✓ Suitable where the long sequence have same value like 900 ones followed by 300 zeros

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Frequency Dependent encoding

- ✓ Length of the bit pattern used to represent a data item is inversely related to the frequency of the item's use
- ✓ Variable Length codes
- ✓ Huffman Codes.

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Huffman Codes

✓ In English language characters 'e, t, a, i' are more frequent than 'z, q, x', So using smaller bit patters to represent: 'e, t, a, i' would save space.

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Relative Encoding/Differential Coding

- ✓ Stream of data differs only slightly from the previous ones. Like motion picture.
- ✓ Record differences rather than storing the whole frame again

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Dictionary Encoding

- ✓ Store just a reference to a dictionary term not the whole word.
- ✓ Especially used by word processors as they have already dictionary for spell check.

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Adaptive Dictionary Encoding

- ✓ Dictionary dynamically changes over time, when a larger unit is found, it is added in the actual dictionary.
- ✓ One example is: Lempel-Ziv-Welsh (LZW) encoding

Applying LZW technique

Example

xyz xyz xyz xyz xyz xyz xyz xyz xyz xyz xyz xyz xyz

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Summary

Compression Techniques

- ✓ Generic data compression techniques
- ✓ Lossless and Lossy techniques
- ✓ LZW with example

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